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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/881,167

06/14/2001

Richard A. Skogman

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11/19/2003

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EXAMINER

AL NAZER, LEITH A

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AN

<b>Office Action Summary</b>	<b>Application No.</b> 09/881,167	<b>Applicant(s)</b> SKOGMAN, RICHARD A.	
	<b>Examiner</b> Leith A Al-Nazer	<b>Art Unit</b> 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 17-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32 is/are allowed.
- 6) ☒ Claim(s) 1-15, 17-31 and 33-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

*Paul IP*

PAUL IP  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12 and 13                      6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Allowable Subject Matter*

1. Claim 32 is allowed.

2. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not teach some of the limitations found in independent claim 32. Lott, Johnson '683, and Sun '241 all do not teach an implanted region with in the substrate, as is required by independent claim 32. Therefore, independent claim 32 is allowable over the prior art of record.

*Claims 1-15 and 17-32 are with drawn from allowance for the following reasons.*

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 33-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 33 recites the term "laser area". This term is vague and indefinite. Examiner is unsure of the structure Applicant is attempting to claim with the inclusion of the term "laser area".

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-9, 13-15, 17-23, 27, 28, 33-42, 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Lott et al.

With respect to claims 1, 14, and 15, Lott teaches a substrate (see Figure 1); a laser area comprising a bottom semiconductor DBR stack, an active region, and a partial top semiconductor DBR stack positioned upon the substrate (see Figure 1); a dielectric mirror forming an aperture area and being positioned upon the partial top semiconductor DBR stack (see Figure 1); and an implanted region (H<sup>+</sup> implant in Figure 1) configured around the aperture area but not penetrating the aperture area. Claim 1 recites method steps for manufacturing the vertical cavity surface-emitting laser device of independent claims 15, 28, 32, and 33. Such method steps are inherent as a product-by-process from the apparatus provided by Lott.

With respect to claim 2, Lott shows epitaxially grown layers comprising a bottom semiconductor DBR stack, an active region, and a top semiconductor DBR stack (see Figure 1).

With respect to claims 3, 17, and 36, Lott teaches the top semiconductor DBR stack containing material chosen from the group consisting of aluminum, gallium, arsenic, indium, phosphorous, and combinations thereof (see Figure 1).

Art Unit: 2828

With respect to claims 4, 18, and 37, Lott teaches the top semiconductor DBR stack comprising alternating layers of aluminum gallium arsenide and aluminum arsenide (see Figure 1).

With respect to claims 5, 19, and 38, Lott teaches the top semiconductor DBR stack being doped (see n+ in Figure 1).

With respect to claims 6-9, 20-23, and 39-42, Lott teaches the top semiconductor DBR stack having eleven individual layers or less (page 1397, 2<sup>nd</sup> column).

With respect to claims 13, 27, and 46, Lott teaches the device being a vertical cavity surface-emitting laser (Figure 1).

With respect to claims 28-31, Lott teaches a vertical cavity surface emitting laser comprising a substrate; a bottom semiconductor DBR stack; an active region comprising an aperture where light is emitted; a top semiconductor DBR stack; and a dielectric mirror positioned directly on the top semiconductor DBR stack over the aperture of the active region, wherein the bottom semiconductor DBR stack and the top semiconductor DBR stack comprise epitaxial layers and the bottom semiconductor DBR stack comprises more epitaxial layers than the top semiconductor DBR stack.

With respect to claims 33-35, Lott teaches a laser comprising a substrate; a laser area comprising a bottom semiconductor DBR stack, an active region, and a partial top semiconductor DBR stack positioned upon the substrate; a dielectric mirror forming an aperture area and being positioned upon the partial top semiconductor DBR stack; and an implanted region configured around the aperture area but not penetrating the aperture area, wherein the aperture area has a width of about 2 to 25  $\mu\text{m}$  (page 1397, 2<sup>nd</sup> column).

Art Unit: 2828

7. Claims 1-5, 10-15, 17-19, and 24-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnson '683.

With respect to claims 1, 14, and 15, Johnson teaches a substrate (14); a laser area comprising a bottom semiconductor DBR stack (58), an active region (64 and 66), and a partial top semiconductor DBR stack (68) positioned upon the substrate; a dielectric mirror (90) forming an aperture area and being positioned upon the partial top semiconductor DBR stack; and an implanted region (76 and 82) configured around the aperture area but not penetrating the aperture area. Claim 1 recites method steps for manufacturing the vertical cavity surface-emitting laser device of independent claims 15, 28, 32, and 33. Such method steps are inherent as a product-by-process from the apparatus provided by Johnson.

With respect to claim 2, Johnson shows epitaxially grown layers comprising a bottom semiconductor DBR stack, an active region, and a top semiconductor DBR stack.

With respect to claims 3 and 17, Johnson teaches the top semiconductor DBR stack containing material chosen from the group consisting of aluminum, gallium, arsenic, indium, phosphorous, and combinations thereof (column 2, lines 28-31).

With respect to claims 4 and 18, Johnson teaches the top semiconductor DBR stack comprising alternating layers of aluminum gallium arsenide and aluminum arsenide (column 2, lines 28-31).

With respect to claims 5 and 19, Johnson teaches the top semiconductor DBR stack being doped (column 2, lines 31-34).

Art Unit: 2828

With respect to claims 10-12 and 24-26, Johnson teaches the dielectric material being chosen from the group consisting of silicon dioxide, titanium dioxide, silicon nitride, and combinations thereof (figures 3-5).

With respect to claims 13 and 27, Johnson teaches the device being a vertical cavity surface-emitting laser (figures 1 and 3-5).

With respect to claims 28-31, Johnson teaches a vertical cavity surface emitting laser comprising a substrate (14); a bottom semiconductor DBR stack (58); an active region (64 and 66) comprising an aperture where light is emitted; a top semiconductor DBR stack (68); and a dielectric mirror (90) positioned directly on the top semiconductor DBR stack over the aperture of the active region, wherein the bottom semiconductor DBR stack and the top semiconductor DBR stack comprise epitaxial layers and the bottom semiconductor DBR stack comprises more epitaxial layers than the top semiconductor DBR stack.

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 1-15, 17-28, and 33-46 are rejected under 35 U.S.C. 102(a) as being anticipated by Sun '241.

With respect to claims 1, 14, and 15, Sun teaches a substrate (102); a laser area comprising a bottom semiconductor DBR stack (104), an active region (108), and a partial top semiconductor DBR stack (114) positioned upon the substrate; a dielectric mirror (134) forming

Art Unit: 2828

an aperture area and being positioned upon the partial top semiconductor DBR stack; and an implanted region (116) configured around the aperture area but not penetrating the aperture area. Claim 1 recites method steps for manufacturing the vertical cavity surface-emitting laser device of independent claims 15, 28, 32, and 33. Such method steps are inherent as a product-by-process from the apparatus provided by Sun.

With respect to claim 2, Sun teaches epitaxially grown layers comprising a bottom semiconductor DBR stack, an active region, and a top semiconductor DBR stack.

With respect to claims 3, 17, and 36, Sun teaches the top semiconductor DBR stack containing material chosen from the group consisting of aluminum, gallium, arsenic, indium, phosphorous, and combinations thereof (column 3, lines 14-18).

With respect to claims 4, 18, and 37, Sun teaches the top semiconductor DBR stack comprising alternating layers of aluminum gallium arsenide and aluminum arsenide (column 3, lines 14-18).

With respect to claims 5, 19, and 38, Sun teaches the top semiconductor DBR stack being doped (column 2, lines 5-12 and 30-35).

With respect to claims 6-9, 20-23, and 39-42, Sun teaches the top semiconductor DBR stack having eleven individual layers or less (column 2, lines 30-35).

With respect to claims 10-12, 24-26, and 43-45, Sun teaches the dielectric material being chosen from the group consisting of silicon dioxide, titanium dioxide, silicon nitride, and combinations thereof (column 3, lines 12-14).

With respect to claims 13, 27, and 46, Sun teaches the device being a vertical cavity surface-emitting laser (column 1, lines 5-10).



Art Unit: 2828

With respect to claims 28-31, Sun teaches a vertical cavity surface emitting laser comprising a substrate (102); a bottom semiconductor DBR stack (104); an active region (108) comprising an aperture where light is emitted; a top semiconductor DBR stack (114); and a dielectric mirror (134) positioned directly on the top semiconductor DBR stack over the aperture of the active region, wherein the bottom semiconductor DBR stack and the top semiconductor DBR stack comprise epitaxial layers and the bottom semiconductor DBR stack comprises more epitaxial layers than the top semiconductor DBR stack (column 2, lines 5-12 and 30-35).

With respect to claims 33-35, Sun teaches a laser comprising a substrate (102); a laser area comprising a bottom semiconductor DBR stack (104), an active region (108), and a partial top semiconductor DBR stack (114) positioned upon the substrate; a dielectric mirror (134) forming an aperture area and being positioned upon the partial top semiconductor DBR stack; and an implanted region configured around the aperture area but not penetrating the aperture area, wherein the aperture area has a width of about 2 to 25  $\mu\text{m}$  (column 3, line 2).

### ***Communication Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leith A Al-Nazer whose telephone number is 703-305-2717. The examiner can normally be reached on Monday-Friday 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on 703-308-3098. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7724.

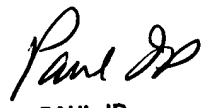
Application/Control Number: 09/881,167

Page 9

Art Unit: 2828

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3329.

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